
Development and Implementation of FSCS (Fisheries Scientific Computing System)

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Overview

- What is FSCS?
- History of Initial Development
- Expansion to Other Centers
- Building a National Coordinated Effort
- Current Status & Near Term Schedule
- Long Term Goals
- Keys to Success (So Far)

What is FSCS?

FSCS is a software application developed to electronically, collect, store and edit a variety of fisheries data in real time on the back deck of FRV's and chartered vessels for trawl surveys.

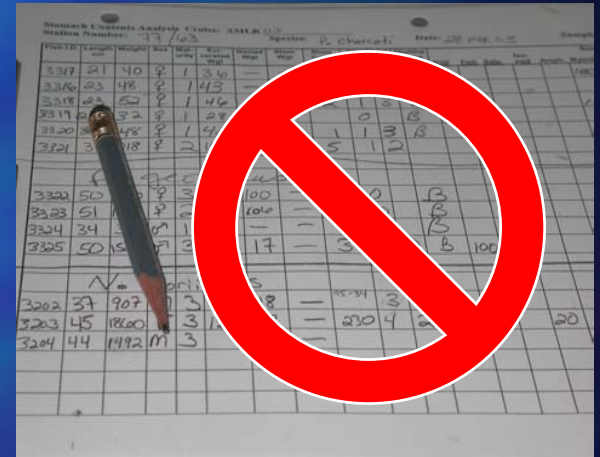
FSCS also:

- Interfaces with SCS (Scientific Computing System) to collect real time environmental and trawl mensuration data
- Integrated into the latest ruggedized electronic data gathering devices such as motion compensation scales, bar code reader, laptops, and tablets

Early Project Goals

Eliminate Manual Entry of Data

- Sampling efficiency is low
- Transcription errors are high
- Real-time error checking is not possible
- Painfully tedious
- Expensive
- Long turn around time (3 months) before data is available



FSCS Design Requirements

- Improve efficiency of data collection process
- Improve quality of data
- Require minimal training
- Automatically track fish sampling protocols
- Minimize data processing time
- Utilize SCS for Trawl Event Data
- Produce Oracle ingestible data files
- Rugged system hardware to withstand harsh environment

FSCS Timeline

- 1999 Collaboration between NMAO and NEFSC review current survey sampling operation for development of FSCS
- 2000 FSCS deployed on board R/V Albatross
- 2001 FSCS development began for the SEFSC
- June 2002, 1st FSCS deployment on board the Oregon II (SEFSC)
- October 2002, FSCS developed began for AFSC & NWFSC
- Spring 2003 1st deployment on board R/V Miller Freeman (Alaska Hydroacoustics group, MACE Division)
- June 2003 1st deployment on board charter vessels-Ms. Julie and Capt. Jack (NWFSC, FRAM Division)

Trawl Survey Vessels



- NOAA Fisheries Research Vessels (185'-225')

- Hardwired Permanent FSCS System



- Chartered Fishing Vessels (65'-185')

- Wireless, mobile with ruggedized laptops/tablets and communications box

Survey Electronic Data Collection System

Lat/Long & Time
Environmental Data
(Real Time-GPS)

Trawling Attributes
(Real Time-Simrad ITI)

SCS

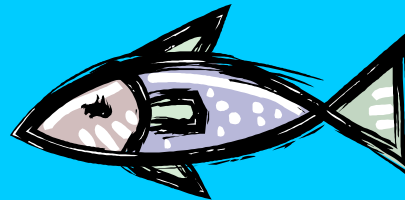
Tow Logger

Integrator

BCS
(post-tow)

FSCS (Back Deck)

Fisheries Scientific Collection System



FSCS-Small boat mobile at-sea collection system

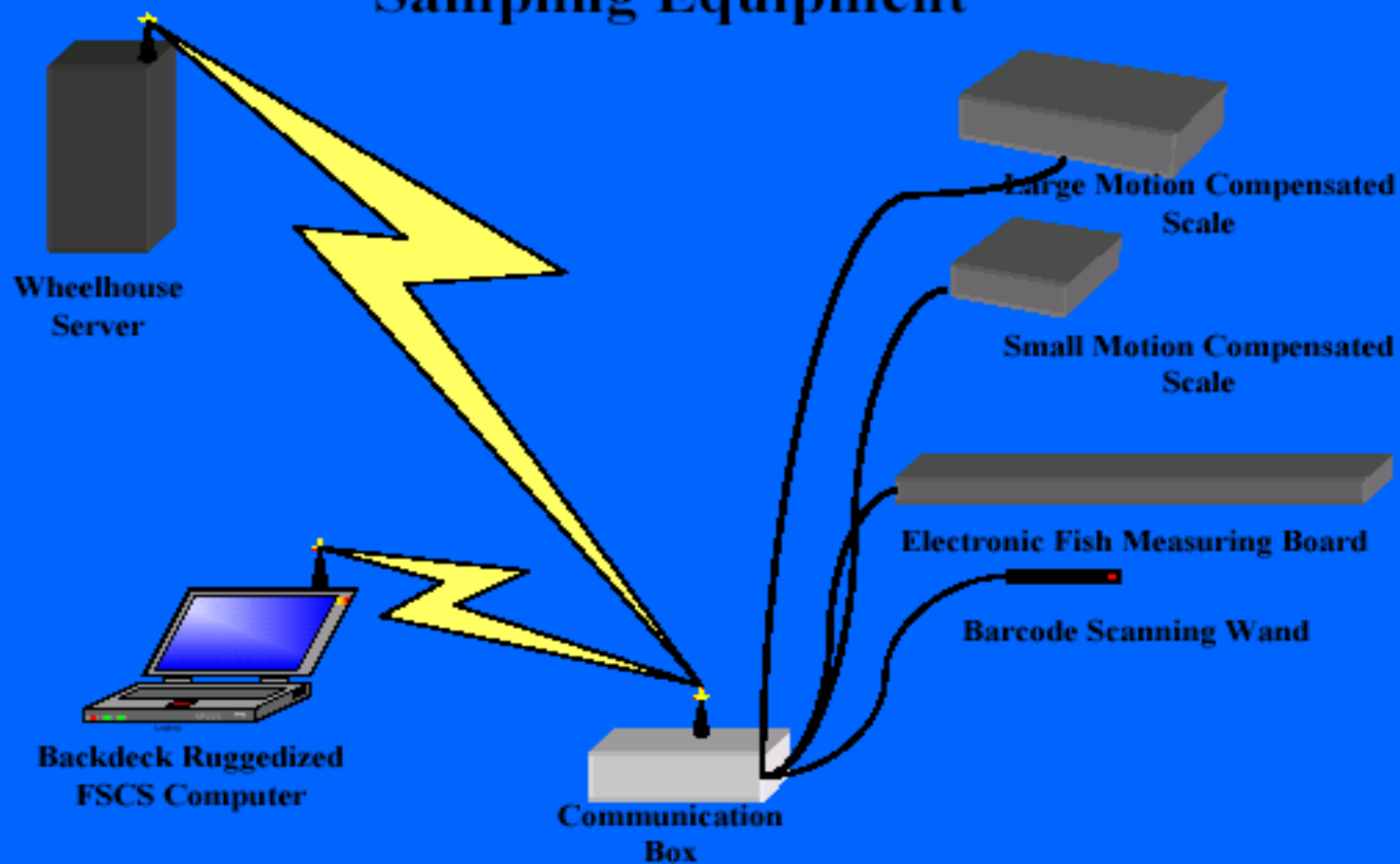
Fish Lengthing Board

Wireless communications box &
Battery power/charger

Itronix Ruggedized Laptop



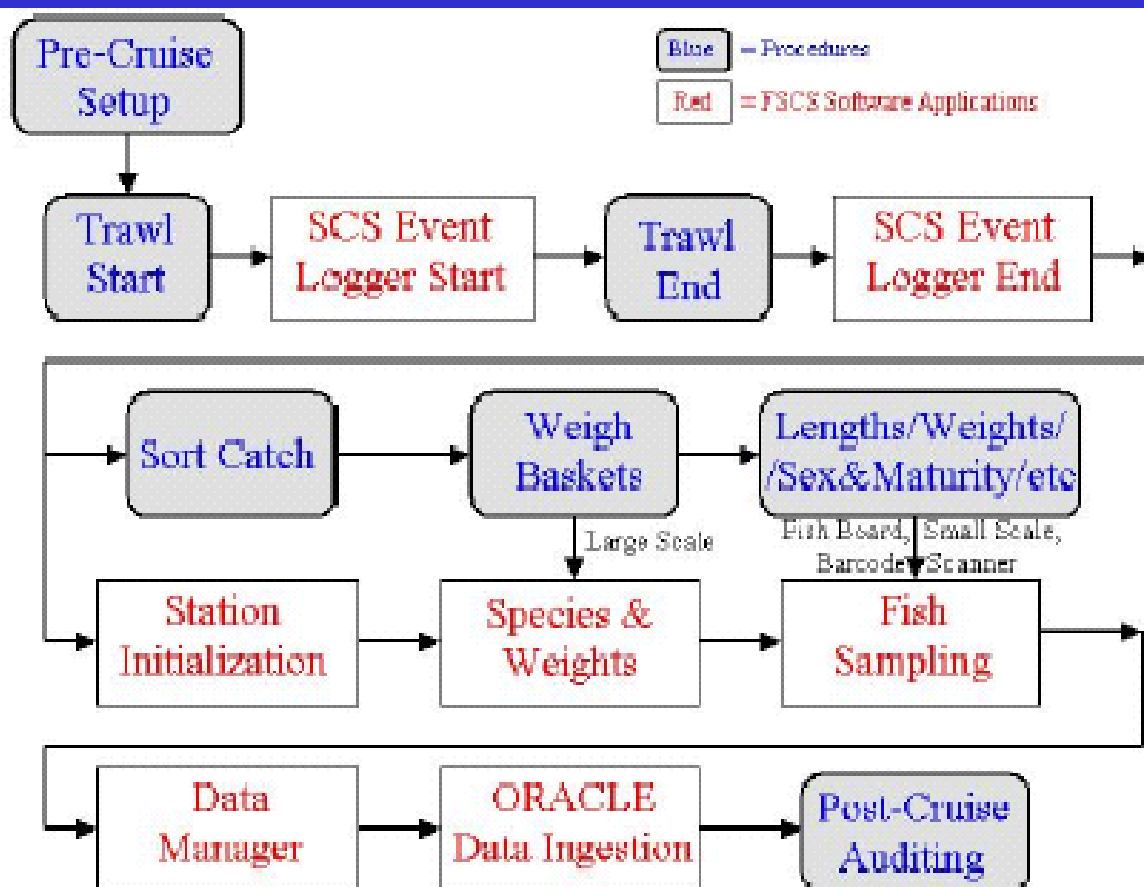
2003 Back Deck Electronic Fish Sampling Equipment



FSCS-Permanent Fixed Sampling Station



FSCS Workflow





Entering Total Catch Weight

FSCS 1.6 AKFSC Total Catch Weight v. 4 Station 324

☒ Table (Whole Haul) Method

☐ Bins Method

☐ Crane-Scales Method

☐ Codend Method

☐ Visual Weight Method

Continue Cancel

FSCS 1.6 AKFSC Total Catch Weight v. 4 CRANESCALE Method for Station 324

Enter Weight (Kg)

Accept Weight

862.000

Modify

Delete

Total Weight (kg) 862.000

NetTare Weight (Kg) 150

Calculate Net Fish Weight

Fish Weight (Kg) 712.000

7 8 9

4 5 6

1 2 3

0 . Clear

Save & Exit

Cancel

Page Info

FSCS 1.6 AKFSC Total Catch Weight v. 4 CODEND Method for Station 324

Shape: Ellipsoid

Length: D1: 20

Width: D2: 10

Height/Diagonal: D3: 8

Density: 1 D4:

Calculate

Volume (Cubed) 837.758

New Weight (Kg) 837.758

Accept New Weight

ELLIPSOID

Number Pad

7 8 9

4 5 6

1 2 3

0 . Clear

Save & Exit

Cancel

Page Info

Weight	Volume	Shape	L	W	H	D1	D2	D3	D4	Density
Total Weight (kg) 0.0										

Modify Delete

Catch Sampling

FSCS 1.6 NEFSC Species and Weights v. 44 Last Save: 13:29:35

Selected Species Name

Station Number 004

Total Catch Weight (Kg) 523.98

Total Species 8

Selected Species	Weights (...)	#	Sub Method	M...	Count
AMERICAN PLAICE	9.300	1			
BUTTERFISH	45.000	1			
COD	208.980	5			
HADDOCK	21.500	1			
RED HAKE	50.000	2			
SILVER HAKE	56.300	2			
SPINY DOGFISH FEMALE	56.200	1			
SPINY DOGFISH MALE	76.700	2			

Add

Add To Mix

Create Mix

Delete

Full Species List Short List

Page Info Species Info

+/- Weights Save Data Load Data Sub-Sample Species Add Co

FSCS 1.6 NEFSC Species and Weights v. 44 Plus/Minus Fish Weight

Select Species for Weight REMOVAL

SPINY DOGFISH MALE

SPINY DOGFISH FEMALE

SILVER HAKE

COD

RED HAKE

HADDOCK

AMERICAN PLAICE

BUTTERFISH

Select Species for Weight ADDITION

SPINY DOGFISH MALE

SPINY DOGFISH FEMALE

SILVER HAKE

COD

RED HAKE

HADDOCK

AMERICAN PLAICE

BUTTERFISH

Select Species for Weight REMOVAL

SPINY DOGFISH MALE

Total Species Weight (Kg): 76.700

Enter Weight

7	8	9	0.953
4	5	6	Clear
1	2	3	
0	.	BackSpace	

Select Species for Weight ADDITION

SPINY DOGFISH FEMALE

Total Species Weight (Kg): 56.200



Cancel

Remove ONLY

Page Info

Remove & Add



Number Of Baskets: 1

Species Load Time: 14:05:20

Current Station

225

Species Name

NIGHT SHARK

Species Code

934

Total Count

0

Sex Code

0

Age Protocol

Stomach Protocol

Disable Protocol

Measurement Type

TOTAL

Length Method

☐ Fish Board
 ☒ Manual
 ☐ Calipers

Measure Time:

Fish Length:

Manual Number Pad

7

8

9

Clear

4

5

6

BackSpace

1

2

3

Accept

0

.

Length	Fish ID	Age	Stomach	Weight	Special
6	1	Y		5.000	
3	2	Y	E	5.000	
5	3	N		3.000	Y
7		N			
8		N			
1		N			
6		N			
5		N			

Total Fish Measured

8

Delete Entry

Modify Length

Back to Species Selection

Page Info

Fish Info

Print Generic Tag

Manual Protocol >>>> Weight/Sex & Maturity

Age Sample & Special Project Collections


Species Name: FLOUNDER EYED Stomach Required --> NO Age Required --> NO Special Sample Requested --> NO

225 ← Current Station

Fish ID: 1 Fish Length: 8 cm

Weight Method: ☐ Scale ☒ Manual

Weight: Measure Time: 14:03:55 Fish Weight: 5 Kg

Manual Weight Entry → 

Sex: ☐ Male ☒ Female ☐ Unknown

Maturity: ☐ UNKNOWN ☒ IMMATURE ☐ DEVELOPING ☐ RIPE ☐ RIPE & RUNNING ☐ N/A ☐ SPENT ☐ RESTING

Young Of The Year? ☐ Yes ☒ No Max Length: Print YOY Tag

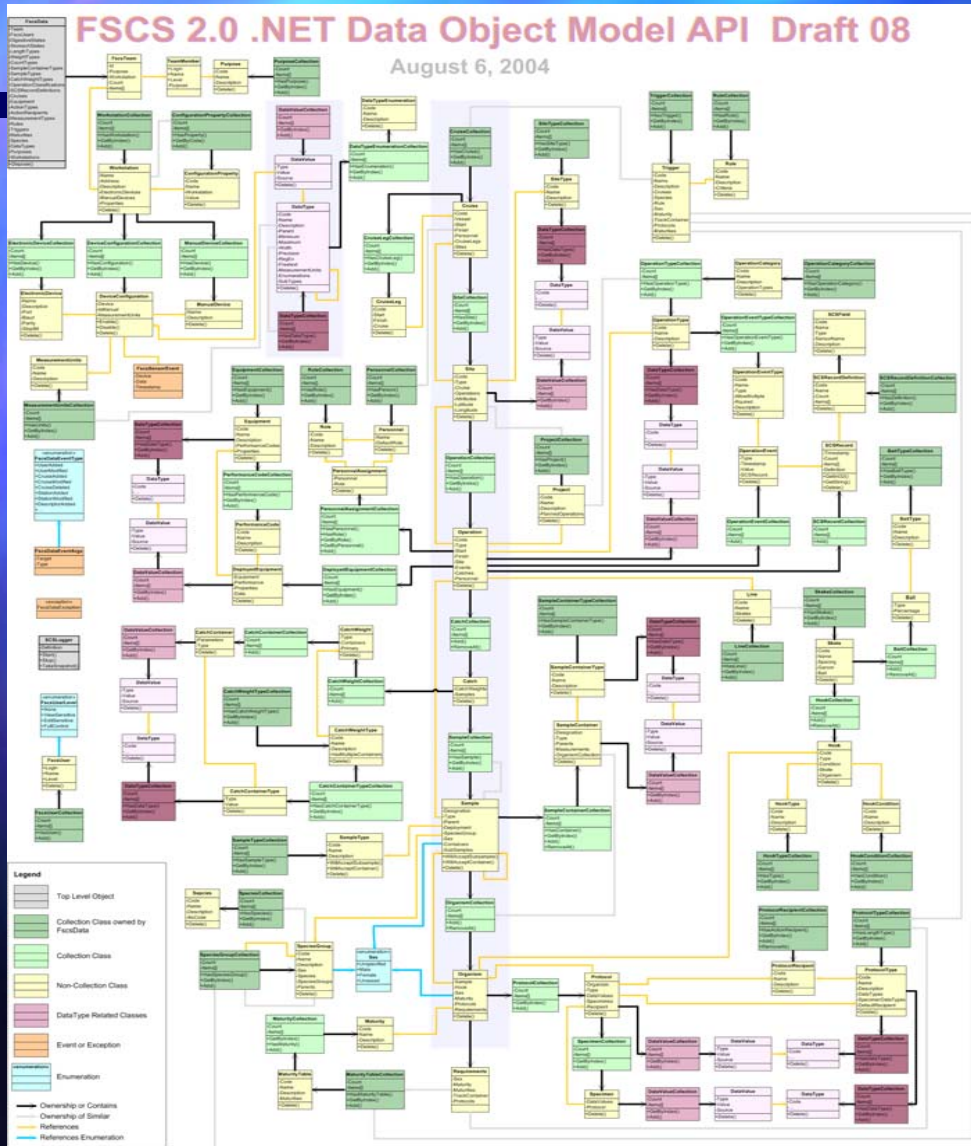
Age Sample (Not Required): Select Sample Type: Otoliths Bar Code Value: Manual Age Tag Remove Age Sample

Special Sample (None Requested):

Building a National Coordinated Effort

- 1st National FSCS Meeting in December 2003
 - Agreed to develop FSCS version 2.0 to incorporate back-end database
 - Expansion to include longline, pot, and other platforms
 - Expand program to include at sea observer collection
- Assigned a national coordinator to serve as POC at HQ
- Created a FSCS website (<http://www.st.nmfs.noaa.gov/fscs/>)

Current Status & Near Term Schedule



- Completed FSCS version 2.0 requirements document
- Completed FSCS version 2.0 data model
- Developing a longline prototype for survey and observers
- Prototype testing in HI observer program January 2005

Long Term goals

- Sharing information & upgrades
- Volume Discounts on Hardware/Software
- Cross training of personnel
- Standardized FIS Data integration



Survey

Observers

Other



Regional Database



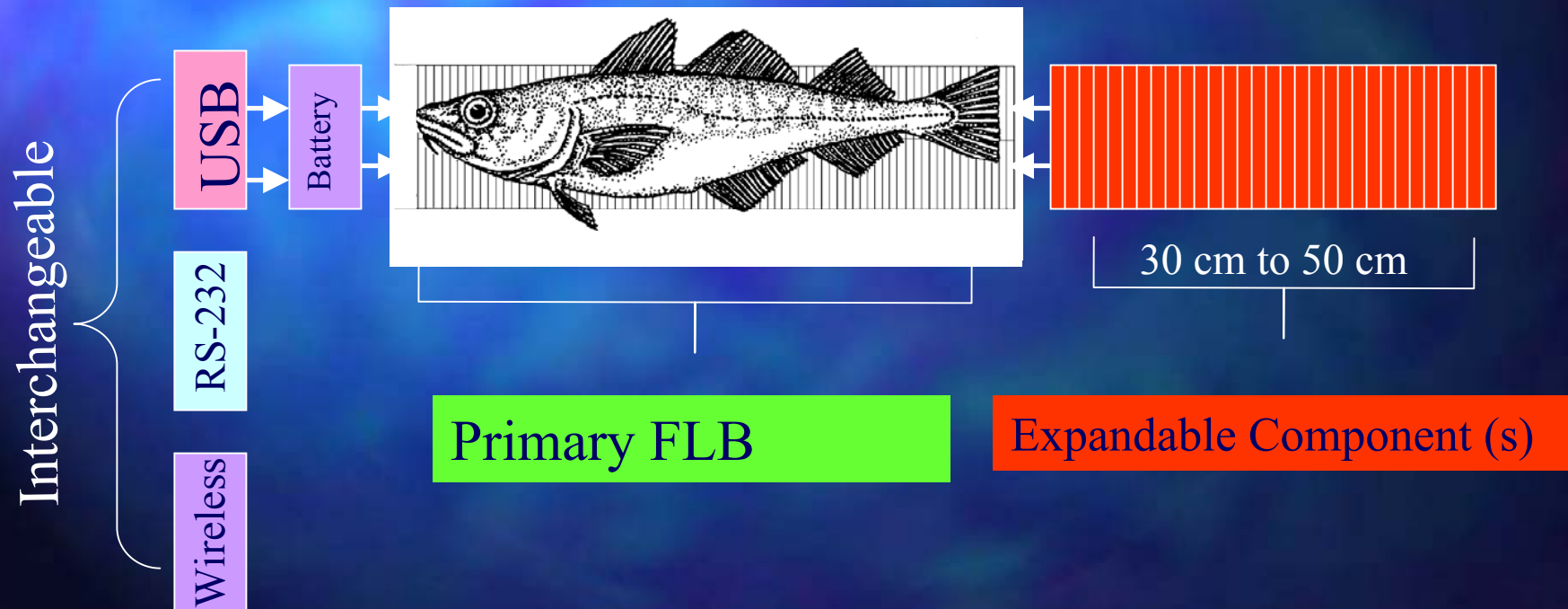


Future Enhancements

- Voice Recognition software (Hands free option)
- Integration with VMS systems for data acquisition and transmission
- Expand FSCS to and recreational vessels
- Continue to find ways to reduce equipment costs

Electronic Fish Lengthing Board General Concept

- Multiple expandable length components could be fitted to length very large fish up to 200 cms.





What Has Worked (So Far!)

- Clearly identified need and potential product
- Support from upper management (NMAO & NEFSC)
- Dedicated time and personnel to develop product
- Good salesmanship & ability to use the product
- Excellent interpersonal skills from NMAO staff
- Funding support from HQ, field, and other sources
- **Most importantly-a commitment from all the players to successful development and implementation**

FSCS Team

- NMAO: Dennis Shields, Sandy Chang, Doug Perry, Jason Fabritz, John Katebini
- S & T: Doug Turnbull, Tina Chang
- NEFSC: Nancy McHugh, Paul Kostovick
- SEFSC: Mark McDuff, Chuck Schroeder, Mark Grace
- NWFSC: Beth Horness, Victor Simon, Pat Patterson
- AFSC: Mike Brown, Kresimir Williams, Robin Harrison, Jason Connor
- PIRO: Karen Sender, Joe Arcenaux